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ABSTRACT

Age and sex effects in multiple dimensions of self-concept were examined in responses by 3,562 preadolescent students (grades 2 to 6) to the Self Description Questionnaire (SDQ). A factor analysis of responses clearly identified the seven facets of self-concept which the SDQ is designed to measure: physical ability, physical appearance, peer relations, parent relations, reading, math, and general-school. Significant age and/or sex effects were found in each of the SDQ scales, but the size and direction of the effects varied with the scale. The largest sex effects were for physical abilities (favoring boys) and reading (favoring girls), but the sex difference was small for the sum of all scales. For every scale there was a linear decline in self-concept with increasing age. This decline is explained by cognitive development. Very young children have unrealistically high self-concepts due to their egocentrism. Self-concepts decline or become more realistic as children incorporate more external information. (Author/BS)

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Age and Sex Effects in Multiple Dimensions of Preadolescent Self-Concept

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Age and Sex Effects in Multiple Dimensions
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ABSTRACT

Age and sex effects in multiple dimensions of self-concept were examined in responses by 3,562 preadolescent students (grades 2 to 6) to the Self Description Questionnaire (SDQ). A factor analysis of responses clearly identified the seven facets of self-concept which the SDQ is designed to measure. Significant age and/or sex effects were found in each of the SDQ scales, but the size and direction of the effects varied with the scale. The largest sex effects were for Physical Abilities (favouring boys) and Reading (favouring girls), but the sex difference was small for the sum of all scales. For every scale there was a linear decline in self-concept with increasing age, and a proposal to explain this decline was examined

Age and Sex Effects in Multiple Dimensions
of Preadolescent Self-Concept

The purposes of this investigation are to examine age and sex effects on multiple dimensions of preadolescent self-concept in responses to the Self Description Questionnaire (SDQ), to replicate the findings of Marsh, Barnes, Cairns and Tidman (1984), and to examine possible explanations of the sex and age effects.

Age Effects in Self-concept.

Wylie (1979) summarized research conducted prior to 1977 and concluded that there was no convincing evidence for any age effect, either positive or negative, in overall self-concept in the age range of 6 to 50. Marsh, Barnes, et al. (1984) reviewed more recent research, some of which suggested that the self-concepts of young children are typically very high and decline during preadolescent years (e.g., Eshel & Klien, 1981; Nicholls, 1979; Stipek, 1981). Meece, Parsons, Kaczala, Goff & Futterman (1982), on the basis of an extensive literature review, concluded that there was a steady decline in math self-concepts from elementary to secondary school years. Still other research suggests that this apparent decline in preadolescent self-concepts may level out during adolescent years so that by middle-to-late adolescent years self-concept increases with age. For example, Marsh, Parker & Barnes (in press), using responses to the SDQ II by high school students, reported that multiple dimensions of self-concept declined between grades 7 and 9, leveled out, and then increased between grades 9 and 12. Piers and Harris (1964) also reported a curvilinear relationship in which self-concept declined between third and sixth grades, but increased between sixth and tenth grades. An increase in self-concept during middle and late adolescent years was also found by Bachman and O'Malley (1977) in a longitudinal study based upon a large national sample of tenth-grade boys. They reported a steady increase in self-concepts collected from the same subjects in 10th grade, 11th grade, 12th grade, and five years after graduation from high school. Fleming and Courtney (1984) reported generally positive correlations between age and self-concept in a sample of university students. In summary, contrary to Wylie's conclusion, there appears to be evidence of a decline in self-concept with age during preadolescent and perhaps early adolescent years, though the affect of age on self-concept may be curvilinear such that self-concepts increase during middle-to-late adolescent years.

Some studies suggest that the decline in preadolescent self-concept with age may occur because children incorporate more external information into the formation of their self-concepts as they become older. For example, Stipek (1981) asked children in grades 3 to 6 to rate their own "smartness" and the children were judged in terms of academic performance by their teachers.

Self-ratings by the youngest children were consistently highest, and uncorrelated with teacher ratings; self-ratings by the oldest children had the lowest mean, the highest standard deviation, and the most positive correlation with teacher ratings. Nicholls (1979) found a similar pattern of results when he asked children aged 6 to 12 to compare their own reading ability with that of their classmates, and these self-ratings were compared with teacher ratings of reading achievement. Ruble, Boggiano, Feldman and Loeb (1980) manipulated feedback given to kindergarten, second-grade, and fourth-grade students in a basketball shooting task, and then asked the children to rate their own ability in this task. Self-ratings by the youngest children were significantly higher, but only responses by the oldest children were significantly related to the feedback which they were given in this nonacademic task. Piers and Harris (1964) found that correlations between self-concept and achievement were larger in grade 6 than grade 3. Burns (1979, p. 212) described results from an unpublished dissertation by Kiefer (1973) who found that the relationship between academic self-concept and teachers' marks grew steadily stronger from grade 1 to 8 (ages 5 to 13). In an extensive meta-analysis of the self-concept/achievement relationship, Hansford and Hattie (1982) reported that the relationship becomes steadily larger with age during the preschool to secondary school period.

While many researchers have focused on the relationship between <u>levels</u> of self-concept and age, some have proposed age effects in the <u>structure</u> of self-concept. For example, Shavelson, Hubner and Stanton (1976) hypothesized a multifaceted, hierarchical structure of self-concept which becomes more differentiated with age. Similarly, Werner's (1957, p. 126) orthogenic principal states that "whenever development occurs, it proceeds from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation, and hierarchical integration" (Werner, 1957, p. 126). Montemayor and Eisen (1977) translated Werner's principal to mean that "as an individual matures, his cognitions about the physical world undergo a shift from a concrete to an abstract mode of representation" (p. 314). They examined responses to the open-ended question "Who Am I?" for subjects in grades 4 to 12, and found support for their hypothesis (but see Harter, 1983). Shavelson and Marsh (in press) translated the hypothesis that self-concepts become increasingly differentiated with age to mean the correlations among different areas of self-concepts become smaller as children grow older. They found support for their this hypothesis in responses to the SDQ by primary school students in grades 2 to 5.

In summary, as preadolescent children grow older, their self-concepts appear to become lower, more highly correlated with external criteria, and

b ter differentiated.

S Self-concept.

Wylie (1979), in her comprehensive review of research conducted prior to 1977, concluded that there was no evidence for sex differences in overall self- at any age level. She suggested, however, that sex differences in specific components of self-concept may be lost when items are summed to obtain a total score. Dusek and Flaherty (1981), in their longitudinal study of adolescent self-concept, reported differences in specific self-concepts that were consistent with sex stereotypes; boys had higher self-concepts in masculinity and achievement/leadership but lower self-concepts in congeniality/sociability. Marsh, Parker and Barnes (in press) also found sex differences in specific areas of self-concept for responses by high school students which were consistent with sex stereotypes. The Meece et al. review suggested that girls have lower math self-concepts than do boys by junior high and high school years, though they found few reports of sex differences in math self-concept during primary school years. Marsh, Relich and Smith (1983) examined sex differences for fifth and sixth grade students in responses to the SDQ in coeducational and single-sex schools, and found that in both groups girls had higher self-concepts in Reading and General-School, and lower self-concepts in Physical Abilities, Math and Physical Appearance. However, these sex differences -- whether favouring males or females -- were smaller in the single-sex schools. Fleming and Courtney (1984) found significant sex effects in the self-concepts of university students, but concluded that only the difference in self-concept of Physical Abilities -- favouring boys -- was large enough to be practically significant. In summary, while there appears to be little evidence of sex differences in total or overall self-concept, there does appear to be systematic sex differences in particular dimensions of self-concept which are consistent with sex stereotypes.

The Marsh, Barnes, Cairns, and Tidman (In Press) Study.

The primary purpose of the Marsh, Barnes, et al. study was to examine age and sex effects on preadolescent self-concepts. The results of that study and other SDQ research have shown that the SDQ factor structure is relatively invariant across both age groups (Marsh & Hocevar, in press; Shavelson & Marsh, in press) and sex (Marsh, Smith & Barnes, 1984). While this invariance in the structure of self-concept will not be considered further, it is an important prerequisite to the comparison of levels of self-concept across age and sex groups. After reviewing literature on sex and age effects in self-concept, Marsh et al. hypothesized that: a) where age effects occurred they would show a linear, or at least monotonic decline with increases in age for the preadolescent children; b) where sex differences in self-concept occurred, they would be consistent with sex stereotypes. That study was a cross-

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sectional study, and one of the most difficult problems in this type of research is to demonstrate that different age groups are equivalent on all characteristics that are not specifically age related. Since this is virtually impossible to establish, responses were arranged so that any nonequivalence in age groups worked against the hypothesis of a linear age effect. This was accomplished by selecting second and fifth grade student responses from one set of schools, and third and fourth grade responses from another set of schools. The youngest and oldest children in the study came from the same schools, and so if these students differed systematically from the children from the other set of schools, the effect would appear to be a nonlinear age effect, with self-concepts in Grades 2 and 5 being systematically higher or lower.

Marsh et al. (in press) found that the main effect of sex and/or age was statistically significant for each of the seven SDQ scales, but that the sex-by-age interaction was not significant for any of the scales. Hence, sex differences did not vary with age within the age range considered in the study. Moderate sex differences (i.e., eta > 0.20, or 4% of the variance explained) were observed for Physical Abilities (favouring males) and Reading (favouring females), and smaller differences were observed in several other scales. The effect of grade level was statistically significant for all scales except for responses to the Parent Relations scale which were consistently high over the age range considered. For five SDQ factors, and for all three Total scores, there was a linear decline in self-concepts with increases in grade level. This decline in self-concepts was moderate in size, representing a drop of about one-third of a standard deviation between Grades 2 and 5, was strikingly linear, and was similar for males and for females.

The authors argued that several characteristics of the study made the observed age effects particularly robust. First, the conservative design of the study provided a control against the age effects being a function of nonequivalent samples. Second, the finding that the highest level of self-concept in Grade 2 was reported for Parent Relations, and that for this one scale there was no decline with age, suggested that the decline in other areas of self-concept was not an artifact of a response bias which was age related.

The Present Investigation.

The present investigation is designed to replicate the findings by Marsh, et al. (in press). That study was based upon 658 responses by preadolescents in grades 2 to 5 which were summarised by unweighted scale scores. The present investigation is based upon a much larger (n=3,562, including the 658 responses from the prior study), more representative, sample, and includes responses for children in grade 6 as well as grades 2 to 5. Also, most SDQ

research uses factor scores derived from factor analyses rather than the unweighted scale scores employed in the earlier study, and so analyses described here will compare age and sex effects based upon unweighted scale scores as well as factor scores.

METHOD

Sample and Procedures.

The SDQ was originally developed for children in grades 4 to 6 (ages 9 to 12), but results by Marsh, Barnes, et al. (1984) suggest that the instrument may be appropriate for younger children as well. A normative archive based upon responses by 3,562 Australian students (55% male) from grades 2 (n=170), 3 (n=103), 4 (n=523), 5 (n=1387), and 6 (n=1379) is described in the test manual (Marsh, 1984) and is the data base for analyses described here. These responses were collected by the author or one of his colleagues between 1981 and 1983 as part of a series of research studies described in the manual, and includes responses from all previously published studies by the author which use the SDQ. In every case the SDQ was administered to intact classrooms during regular school hours according to standardized instructions presented in the manual. The researcher read instructions on the front of the instrument, answered questions, and then read each item aloud as children followed along on the survey instrument. The actual presentation of items was rapid and required about 8-10 minutes. While no overall sampling plan was employed, schools were selected to ensure that the students were broadly representative of the population of school children in Sydney (and Wollongong), Australia; schools in the sample included those from geographically diverse regions of this metropolitan area; they included schools in working-class areas, middle-class areas, and upper-middle class areas; they included single-sex schools and coeducational schools; and they included both public schools and private Catholic schools.

The Self Description Questionnaire (SDQ).

The SDQ is designed to measure seven components of preadolescent self-concept derived from Shavelson's theoretical definition and model of self-concept (Shavelson, Hubner & Stanton, 1976; Shavelson & Marsh, in press). These consist of self-concepts in four nonacademic areas (Physical Ability, Physical Appearance, Peer Relations, and Parent Relations) and three academic areas (Reading, Maths, and General-School). A description of the seven-scale instrument, its theoretical rationale, the wording of the items, reliability estimates, and results of earlier factor analyses are summarized in the manual (Marsh, 1984) and elsewhere (Marsh, Barnes, et al., 1984; Marsh, Parker & Smith, 1983; Marsh, Relich & Smith, 1983; Marsh, Smith & Barnes, 1983; 1984). Internal consistency estimates of reliability of the SDQ scales for the data in this study (Marsh, 1984) vary from 0.80 to 0.90 (median = 0.86). This

earlier research has shown the SDQ scales to be moderately correlated with measures of corresponding academic abilities, in agreement with self-concepts inferred by primary school teachers, and systematically related to a wide variety of other constructs which were hypothesized to be related to self-concept. Thus, the SDQ appears to be a well-developed instrument, based on a strong empirical foundation and a good theoretical model, for the measurement of self-concept.

Statistical Analyses.

Responses to the eight positively worded items from each of the seven SDQ scales were divided into four item-pairs which were used in a factor analysis of the SDQ responses; responses to the first two items in each scale were summed to form the first item pair, the responses to the next two were summed to form the second pair, and so forth. The factor analysis of item-pairs is recommended in the SDQ manual because responses to item-pairs, compared with responses to individual items, are more reliable, have less unique variance, and are less likely to be affected by the idiosyncratic wording of a particular item. This procedure does assume that each of the items within the same scale are relatively homogeneous with respect to the content of that scale, an assumption justified on the basis of item analyses presented by Marsh (1984), and information about individual items is lost. Factor analysis (Nie, et al., 1975) was performed on responses to the 28 item pairs using iterated communality estimates, a Kaiser normalization, and an oblique rotation to the final solution with delta equal to -2.0. The SPSS procedure was also used to create factor scores to represent each SDQ scale (see Nie, et al., 1975).

Separate analyses of age and sex effects were conducted on unweighted scale scores (UWS) representing the sum of responses to the eight items used to represent each scale, and on the factor scores (FS) described above. For the unweighted scale scores, Total scores were computed by summing responses to the four nonacademic scales (Total Nonacademic), the three academic scales (Total Academic), and all seven scales (Total Self). For purposes of this study, age groups were defined according the students' year in school. A preliminary MANOVA was used to determine the effects of grade level and sex on the SDQ scales. Next, based on the results of this analysis, separate ANOVAs were performed on each of the SDQ scales. Finally, a hierarchical multiple regression was used to test the linear, quadratic, and cubic components of each age effect. These analyses were performed with the commercially available SPSS statistical package (Hull & Nie, 1981).

Results and Discussion.

Dimensions of Self-concept.

The SDQ was designed to measure seven facets of self-concept derived from the theoretical model proposed by Shavelson. The factor analysis (Table 1) clearly identifies each of the SDQ factors. The factor loadings for item-pairs designed to measure each factor, the target loadings, are substantial, ranging from 0.46 to 0.85 (median = 0.73). The nontarget loadings are much smaller, ranging from -0.02 to 0.19 (median = 0.03). The correlations among the factors are modest, ranging from 0.03 to 0.47 (mean = 0.18), and much smaller than the coefficient alpha estimates of reliability discussed earlier. The largest correlations appear among the first three nonacademic factors, and between General-School and the other two academic self-concepts, which is consistent with the hierarchical ordering proposed by Shavelson et al. (1976). Despite the moderate correlation between General-School and Reading (0.34), and between General-School and Math (0.47), the correlation between Reading and Math (0.05) is close to zero. This near-zero correlation between Reading and Math self-concepts is consistent with previous research, and led Shavelson to revise his self-concept model to include two higher-order academic self-concepts instead of one (Shavelson & Marsh, in press). The results of this factor analysis provide strong support for the multidimensionality of self-concept, and particularly the facets posited in the Shavelson model and identified in previous SDQ research.

Insert Tables 1 and 2 About Here

Factor scores from the factor analysis summarized in Table 1 were derived for all respondents, and correlations among the factors were determined separately for each grade level (see Table 2). The mean correlation among factors is 0.44, 0.28, 0.23, 0.19, and 0.19 in grades 2 to 6 respectively. These findings are consistent with previous SDQ research and the Shavelson model which posits that areas of self-concept become more distinct with age.

Age and Sex Effects in Self-concept.

Age and Sex effects were examined separately for unweighted scale scores (UWS), as in the Marsh, Barnes, et al. (1984) study, and for factor scores (FS) derived from the factor analysis summarized in Table 1. However, the results based upon the two sets of scores are so similar (see Table 3) that the distinction is not important in the discussion of the findings. For each set of scores, a preliminary analysis indicated that the effects of age and sex differed substantially for different components of self-concept. Consequently, separate analyses were performed on each of the seven SDQ scale scores, and on the three total scores (see Table 3 & 4). Partly because of the extremely large sample size, the main effects of age and sex are statistically significant for most SDQ scores. Nevertheless, the sex-by-age interaction reaches statistical significance for only two of the SDQ scales and for none of the Total scores, and accounts for no more than 1/2 of 1% of the variance

in any of the SDQ scores. This lack of interaction supports the finding reported in the earlier study, and indicates that the observed sex effects vary little over the range of preadolescent ages considered in this study.

Insert Tables 3 & 4 About Here

The effect of age is statistically significant for all SDQ scores. Linear, quadratic, and cubic components of the age effect were examined with multiple regression. However, once sex and the linear component of age had been entered into the regression equation, the effects of the higher order trend components failed to reach statistical significance for any of the SDQ scores. The standardized beta weights representing the linear age effect (see Table 3) indicate a modest negative relationship between age and responses to each of the SDQ scores; betas vary from -0.21 to -0.06. Here, unlike the earlier study, the negative linear components for the Parents and Peers scales are statistically significant, though they are still smaller than for any of the other scales. The large differences in the sample sizes of different age groups mean that the trend analyses must be interpreted cautiously. Nevertheless, these findings generally support those from the Marsh, et al. (in press) study, and demonstrate that preadolescent self-concepts are negatively correlated with age in the primary school years.

Sex effects reach statistical significance for most of the SDQ factors (see footnote 1), but the direction of the sex effect varies with the particular component of self-concept (see Table 3). As in Marsh, Barnes, et al. (1984), the two largest sex effects are for Physical Abilities (favouring males) and Reading (favouring females). However, two other scores where girls scored significantly higher, albeit only slightly, in the earlier study, now show no significant sex effect (Parent and Total Academic, and also the General-School for the unweighted scores). Four other scores which showed no significant sex effects in the earlier study now show small effects in favor of males (Physical Appearance, Peer Relations, Math, and Total Self). Hence, it appears that females fare less well in comparisons based upon the entire normative sample. However, the size of the sex effects across all areas of self-concept, both here and in the earlier study, is very small. The sex effect in the Total Self score, the sum of responses to all items, explained only 1/4 of 1% of the variance in the earlier study and 2/3 of 1% in this analysis. In the present analysis, only the sex effect in Physical Abilities accounted for more than 3% of the variance.

Summary and Implications

The factors identified in SDQ responses, and the effects of age and sex in these responses, were consistent with the results of previous SDQ research. The clarity of the factor structure, and the modest size of correlations among

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the factors, support the multidimensionality of self-concept. The finding that the factors become more distinct with age is also consistent with previous SDQ research. The importance of this multidimensionality was further demonstrated in the examination of age and sex effects. Particularly for the sex effects, the size and direction of the effects varied, depending upon the dimension of self-concept. Significant and systematic sex differences in specific facets of self-concept were lost when responses were summed to form a total score. The decline in self-concept with age during preadolescent years, though less dependent upon the particular area of self-concept, was also consistent with earlier SDQ research.

The sex effects observed here, and in Marsh, Barnes, et al. (1984), appear to be consistent with sex stereotypes, but the lack of sex-by-age interaction is, perhaps, surprising. The Meece, et al. review reported that sex differences in both math achievement and math self-concept were small in primary school years, but were larger for students in high school years. Consistent with this review, Marsh, Barnes, et al. (1984) found no significant sex effect in Math self-concept in grades 2 to 5, while Marsh, Parker and Barnes (in press) found a significant sex effect in favour of boys in school years 7 to 12. These results suggest, at least for Math self-concept, that sex differences should become larger as children grow older, and this finding would be consistent with the socialization of sex stereotypes as an explanation for sex differences in self-concepts (see Meece, et al. for further discussion). However, there was little or no sex-by-age interaction in Marsh, et al. (in press), Marsh, Parker, and Barnes (in press), or in the present investigation.

The general decline in self-concepts with age observed in both the present study and in Marsh, Barnes, et al. (1984) was due, at least in part, to the extremely high, perhaps unrealistically high, self-concepts that the youngest children had in all areas. Even in fifth and sixth grades where self-concepts were the lowest, the average response was still about a "4" on a five-point response scale. Consistent with these observations, Stipek (1984; also see Stipek & Tannatt, 1984) described interviews with 96 children at the start of first grade where all claimed to be among the smartest in their class, whereas older childrens' self-perceptions were lower and more realistic.

This decline in preadolescent self-concepts is consistent with the proposal that as children grow older they incorporate more external information into the formation of their self-concepts. Such a proposal may also be consistent with the developmental perspective summarized by Harter (1983) in which childrens's ability to formulate and test aspects of the self-theory they construct to describe themselves improves as the children move

from preoperational, to concrete operational, to formal operational stages of cognitive development. According to the proposal presented here, very young children are egocentric and have consistently high, less differentiated self-concepts in all areas; these self-concepts may be unrealistic and relatively independent of any external criteria. As children grow older they incorporate more external information into their self-concepts so that their self-concepts become more closely aligned with external criteria. For most individual children this implies that self-concepts will decline with age in at least some areas, and that across a broad selection of children self-concepts will decline in all areas. As children incorporate more information about their actual skills and abilities into the formation of their self-concepts in different areas, their self-concepts will also become more highly differentiated as observed in the present study and posited in the Shavelson model of self-concept. Thus, this proposal is consistent with: a) the decline in preadolescent self-concepts with age; b) the finding that self-concepts become more highly differentiated with age; and c) the finding that self-perceptions became more highly correlated with performance and performance feedback with age found in other research.

Apparently there is a systematic decline in self-concepts during preadolescent years, but this result should not be seen as "bad" or unfortunate. Indeed, it appears that the very high self-concepts of the youngest children are unrealistically high, and, perhaps, it would be unfortunate if their self-concepts did not become more realistic on the basis of additional life experience. Particularly in this application, the suggestion that higher self-concepts are automatically "better" is overly simplistic. However, even if the self-concepts of the youngest children are "unrealistic," this should not be interpreted to mean that their self-concepts, or responses to the SDQ, are biased. To the contrary, so long as their responses accurately reflect their self-perceptions, whether or not these perceptions are realistic when judged by external standards, the interpretations based upon the self-concept scores are valid. Instead, the bias lies in the inferred self-concepts based upon the observations by external observers or other test scores which do not reflect this age effect. Future research in self-concept should identify what characteristics validly affect self-concept, develop theoretical perspectives consistent with these effects, and explore the implications of these empirical and theoretical findings.

FOOTNOTES

1 - In a recent revision of the SDQ a General-Self scale has been added to the seven scales described here. However, only 21% of the subjects in the present study completed this version of the instrument, and nearly all of them were from year 5. Consequently, age and sex effects for the General-Self scale were not examined in the present study. Results in the test manual indicate that this scale is identified as a separate factor by factor analysis and that there is a modest sex effect (eta = 0.12) favouring males on this scale.

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TABLE 1
Factor Analysis of Responses (n=3562) to the SDQ

Oblique Factor Pattern Matrix

Variables	PHYS	APPR	PEER	PRNT	READ	MATH	SCHL	commu-nality
Phys1	[67]	03	07	01	00	01	01	453
Phys2	[56]	14	07	06	-01	09	-02	413
Phys3	[84]	05	06	01	02	02	03	643
Phys4	[75]	03	12	03	00	-01	07	589
Appr1	04	[78]	02	08	02	07	01	618
Appr2	02	[80]	06	03	04	00	06	653
Appr3	13	[67]	19	-02	01	00	07	638
Appr4	10	[64]	18	04	01	-01	08	596
Peer1	09	00	[64]	09	00	01	02	431
Peer2	04	14	[63]	06	03	01	10	505
Peer3	06	08	[68]	02	04	07	00	491
Peer4	12	17	[63]	05	00	01	06	555
Prnt1	05	04	04	[57]	01	01	04	319
Prnt2	02	02	01	[56]	06	04	04	302
Prnt3	02	04	11	[72]	04	03	03	501
Prnt4	00	04	07	[78]	01	-01	04	509
Read1	00	02	00	01	[78]	-02	09	606
Read2	00	01	02	02	[85]	02	07	682
Read3	02	04	03	06	[76]	00	14	647
Read4	00	02	03	06	[76]	-01	14	644
Math1	03	04	02	02	-02	[75]	17	692
Math2	03	02	03	04	01	[78]	17	737
Math3	03	01	03	05	00	[79]	17	749
Math4	03	03	04	00	01	[81]	14	757
Schl1	-01	07	04	01	08	10	[65]	510
Schl2	06	11	10	-01	12	17	[46]	476
Schl3	01	-02	00	09	09	16	[65]	593
Schl4	05	01	04	03	09	12	[74]	642

Factor Pattern Correlations

	PHYS	APPR	PEER	PRNT	READ	MATH	SCHL
PHYS	100						
APPR	26	100					
PEER	32	37	100				
PRNT	12	14	22	100			
READ	03	09	03	13	100		
MATH	11	11	13	10	05	100	
SCHL	11	19	20	16	34	47	100

Note: The four measured variables designed to measure each factor are the sum of responses to pairs of items. All parameters are presented without decimal points. Factor loadings in boxes are the loadings of item-pairs designed to measure each factor (target loadings). Responses are from responses in the normative archive described in the SDQ Manual (Marsh, 1984).

TABLE 2
Correlations Among SDQ Factors in Grades 2 to 6

	SDQ Self-Concept Factors						
	PHYS	APPR	PEER	PRNT	READ	MATH	SCHL
Phys							
Grade 2	100						
Grade 3	100						
Grade 4	100						
Grade 5	100						
Grade 6	100						
Appr							
Grade 2	20	100					
Grade 3	19	100					
Grade 4	36	100					
Grade 5	29	100					
Grade 6	29	100					
Peer							
Grade 2	43	47	100				
Grade 3	44	13	100				
Grade 4	44	52	100				
Grade 5	36	45	100				
Grade 6	43	44	100				
Prnt							
Grade 2	48	46	57	100			
Grade 3	21	19	25	100			
Grade 4	19	20	29	100			
Grade 5	09	15	25	100			
Grade 6	13	15	29	100			
Read							
Grade 2	38	42	47	60	100		
Grade 3	00	22	10	50	100		
Grade 4	00	13	17	11	100		
Grade 5	01	06	06	10	100		
Grade 6	-01	06	04	16	100		
Math							
Grade 2	43	25	41	41	47	100	
Grade 3	20	21	28	28	43	100	
Grade 4	11	12	13	16	03	100	
Grade 5	12	12	14	11	00	100	
Grade 6	09	07	07	07	02	100	
Schl							
Grade 2	33	29	31	43	64	67	100
Grade 3	04	30	18	30	65	67	100
Grade 4	17	24	30	22	40	58	100
Grade 5	11	22	22	19	37	53	100
Grade 6	11	19	24	18	38	57	100

Note: The SDQ factors are represented by factor scores derived from the factor analysis summarized in Table 1. Correlations are presented without decimal points.

Table 3

Effects of Age and Sex on SDQ Factors Represented By Unweighted Scale Scores (UWS) and Factor Scores (FS)

Area		Sex Effect	Age Effect	Inter-action	Linear Age Effect
PHYS	UWS	.29**	.14**	ns	-.12**
	FS	.28**	.12**	ns	-.11**
APPR	UWS	.11**	.25**	.07**	-.20**
	FS	.12**	.23**	.08**	-.20**
PEER	UWS	.10**	.14**	ns	-.09**
	FS	.08**	.12	ns	-.08**
PRNT	UWS	ns	.12**	ns	-.07**
	FS	ns	.10**	ns	-.06**
NACD	UWS	.18**	.23**	ns	-.19**
READ	UWS	.16**[a]	.15**	ns	-.13**
	FS	.17**	.13**	ns	-.12**
MATH	UWS	.12**	.14**	ns	-.11**
	FS	.13**	.11**	ns	-.09**
SCHL	UWS	ns [a]	.19**	.06*	-.17**
	FS	.06**	.18**	.07**	-.17**
TACD	UWS	ns	.19**	ns	-.17**
TSELF	UW	.08**	.25**	ns	-.21**

* $p < .01$; ** $p < .001$

a -- Denotes significant sex effects where females had higher self-concepts than males.

Note: Separate two-way ANOVAs were conducted on each SDQ scale and the size of sex and age effects are represented by eta's from those analyses (see Nie, et al., 1975). Linear, quadratic, and cubic components of the age effect were then tested with multiple regression. However, once sex and the linear age component were included in the regression equation, none of the higher-order age components were statistically significant. The effect sizes for the linear effect of age is the standardized beta weights from these multiple regressions, but these differ little from the simple correlations between age and the self-concept scores. The fact that age effects as represented by eta (linear and nonlinear effects) and beta (linear effects only) are similar also demonstrates that most of the effect of age is linear.

Table 4

Sex and Age Effects in the SDQ Scale Scores

	Males						Females					
	Grade Level						Grade Level					
	2	3	4	5	6	Total	2	3	4	5	6	Total
PHYS	36.8	36.8	34.2	34.5	33.6	34.3	33.0	31.2	31.0	31.2	33.6	30.6
APPR	31.8	31.1	27.9	29.4	26.3	28.3	33.8	29.1	27.4	27.8	23.7	26.5
PEER	33.7	32.5	31.2	32.0	30.7	31.5	33.6	31.2	29.9	31.0	29.4	30.4
PRNT	35.9	35.7	35.9	36.0	34.8	35.6	36.2	37.4	34.7	36.1	34.7	35.3
Total NACD	34.7	34.2	32.4	33.1	31.5	31.8	34.3	32.4	30.9	31.7	29.5	30.8
READ	33.7	32.7	30.6	30.5	29.2	30.2	36.2	35.3	32.1	33.0	31.7	32.6
MATH	32.6	32.1	30.1	30.1	28.7	29.7	31.7	32.7	26.5	27.8	26.9	27.6
SCHL	32.1	31.3	29.5	28.5	27.1	28.3	33.5	32.3	27.9	29.4	27.8	28.8
Total ACD	32.8	32.0	30.0	29.7	28.3	29.4	33.8	33.4	28.8	30.1	28.8	29.7
Total Self	34.0	33.4	31.5	31.7	30.1	31.2	34.3	33.2	30.2	31.1	29.4	30.5

Note: Each scale has a possible score between 8 and 40. For the seven SDQ factors this represents the sum of responses to the eight items that define that factor. The Total NACD, Total ACD, and Total Self scores were obtained by summing the responses to the factors that comprise each and then dividing by the number of factors that were summed so that these total scores also have a possible range of 8 to 40. The columns labelled "total" represent the unweighted mean scale scores across all responses by males and by females.

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